

**REMARKS**

The Examiner is thanked for the due consideration given the application.

Upon entry of this amendment, claims 1 and 3-10 and 12-28 are pending in the application. Claim 11 is canceled by this amendment. The independent claims have been amended to incorporate the subject matter of claim 11 and to better set forth that the sidewall only surrounds only sides of the upper portion of the magnetic element.

No new matter is believed to be added to the application by this amendment.

Entry of this amendment under 37 CFR §1.116 is respectfully requested because it places cancels a claim, conforms to a matter of form set forth in the Official Action, and places the application in condition for allowance.

**Claim Objections**

Claim 9 has been objected to as containing an informality. The comments in the Official Action have been considered, and claim 9 has been amended to be free from informalities.

**Rejections Based on GALLAGHER et al.**

Claims 1, 3, 5, 6, and 11-16 remain rejected under 35 USC §102(b) as being anticipated by GALLAGHER et al. Claim 7 has remain rejected under 35 USC §103(a) as being unpatentable over GALLAGHER et al. in view of BHATTACHARYYA. Claims 17 and 18

remain rejected under 35 USC §103(a) as being unpatentable over GALLAGHER et al. in view of YOSHIDA et al. These rejections are respectfully traversed.

The present invention pertains to a magnetic memory having an inorganic sidewall structure surrounding only sides of an upper portion of a magnetic element. This can be clearly seen, by way of example, in Figure 2E of the application, which is reproduced below.

F i g . 2 E

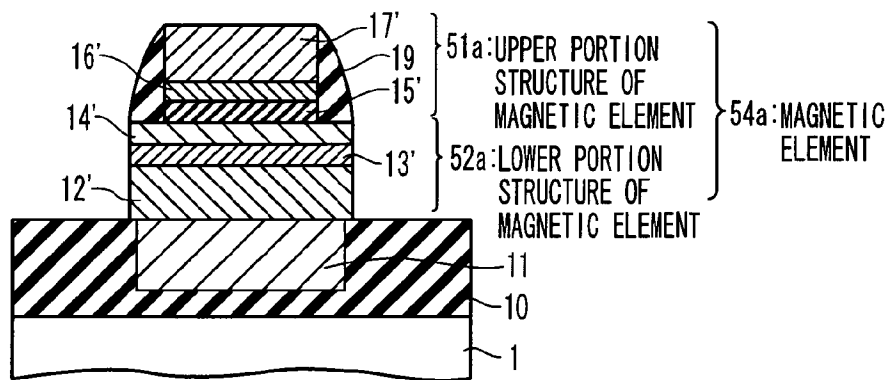


Figure 2E shows a magnetic element with an upper portion and a lower portion. The insulating sidewall is formed over the lower portion and surrounds only the sides of the upper portion (and not the top). Claim 1 of the present invention recites: "*an insulating sidewall provided to surround only sides of said upper portion structure of said magnetic element, said sidewall comprising at least one of silicon oxide, silicon nitride, aluminum oxide or aluminum nitride.*" Analogous recitations can be found in independent claims 4 and 12.

GALLAGHER et al. pertain to magnetic tunnel junctions. The Official Action refers to Figure 8D of GALLAGHER et al., which is reproduced below.

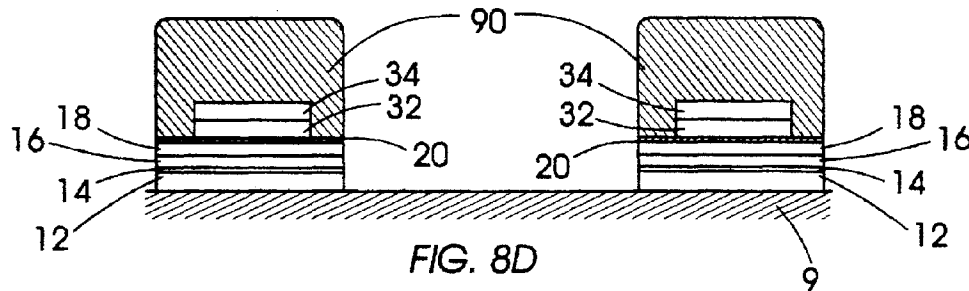
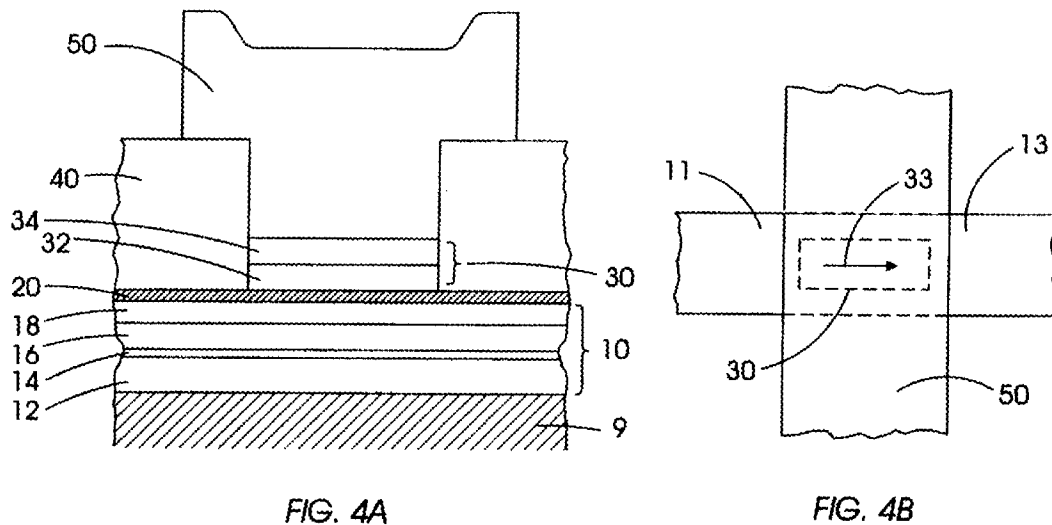


Figure 8D of GALLAGHER et al. shows a structural cross section covered by a **resist pattern** 90, which the Office Action asserts is a sidewall insulating film. As is well known in the art resists are formed from organic materials.

In contrast, the sidewall of the present invention is formed from an inorganic material such as silicon oxide, silicon nitride, aluminum oxide or aluminum nitride. See *independent claims*.

Moreover, this resist pattern 90 is not a **sidewall** or any other permanent structure that surrounds only the sides of the upper structure of the magnetic element. In fact, the bulk of the resist structure appears to be over the top surface of the magnetic element. In contrast, the present invention has a sidewall that does not cover the magnetic element. See *independent claims*.

At page 3, item 9 the Official Action refers to column 5, lines 8-9 of GALLAGHER et al., which states: "The top of electrode stack 30 is surrounded by a 160 nm SiO<sub>2</sub> insulation layer 40 . . . ." This passage refers to Figures 4A and 4B of GALLAGHER et al., which are reproduced below.



As can be clearly seen, the insulation layer 40 does not surround only sides of the electrode stack 30, but extends above the electrode stack 30 to shoulder the top electrode 50.

In contrast, the independent claims of the present invention set forth: "an insulating sidewall provided to **surround only sides of** said upper portion structure of said magnetic element."

Additional distinctions of the present invention over GALLAGHER et al. have been set forth in the previous response which, for brevity, are not repeated here.

BHATTACHARYYA and YOSHIDA et al. fail to address the above-described deficiencies of GALLAGHER et al.

Moreover, the Official Action utilizes BHATTACHARYYA to reject the embodiments of claim 7. However, BHATTACHARYYA does not describe a sidewall, which is incorporated into claim 7 by its dependence upon claim 1. And "d" in claim 7 is defined so that it is clearly the width of the bottom of the sidewall.

BHATTACHARYYA thus cannot be used to assert that the limitations set forth in claim 7 are unpatentable.

GALLAGHER et al. thus fail to anticipate a claimed embodiment of the present invention. One of ordinary skill and creativity would fail to produce a claimed embodiment of the present invention from a knowledge of GALLAGHER et al. together with BHATTACHARYYA or YOSHIDA et al. A *prima facie* case of unpatentability has thus not been made.

These rejections are believed to be overcome, and withdrawal thereof is respectfully requested.

**Rejections Based on OKAZAWA et al.**

Claims 1, 3-5, 8-14, 16, 19 and 21-25 remain rejected under 35 USC §102(e) as being anticipated by OKAZAWA et al. Claim 20 remains rejected under 35 USC §103(a) as being unpatentable over OKAZAWA et al. in view of TUTTLE. Claims 26-28 have been rejected under 35 USC §103(a) as being unpatentable

over OKAZAWA et al. These rejections are respectfully traversed.

OKAZAWA et al. pertain to a method of forming a magnetic memory. The Official Action refers to Figure 2J of OKAZAWA et al., which is reproduced below.

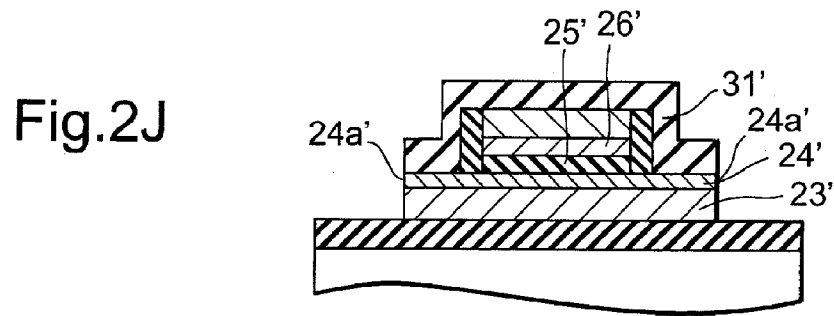
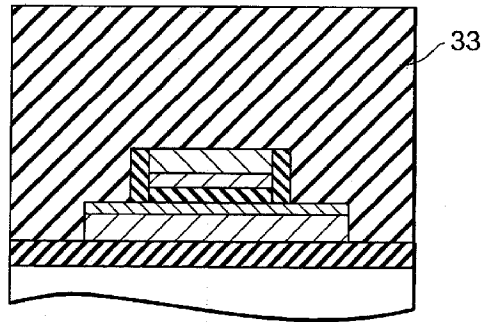


Figure 2J shows a structure including insulating layer 25' and magnetization layer 26', over which is an oxide film pattern 31'.

However, this oxide film pattern 31' does not cover only the sides of the magnetization layer 26', but also covers the top of the structure (which includes upper electrode 27', which is not labeled in Figure 2J).

In OKAZAWA et al. this oxide film pattern 31' is used as a mask and then integrated with silicon film 33, as is shown in Figure 2K (see paragraph 0059), which is reproduced below.

Fig.2K



Also, paragraph 0056 of OKAZAWA et al. teaches that materials forming the insulating film 25 and magnetic film 26 are sputtered to form a side wall structure 30 (See Figure 2E). This mixed material is fundamentally different from the purely insulating materials forming the sidewalls of the present invention.

OKAZAWA et al. thus do not disclose a completed device where the lower portion structure has an outer circumference that is the same as an outer circumference of a bottom of the sidewall, such as is set forth in the independent claims of the present invention.

That is, similar to the rejections based on GALLAGHER et al., an intermediate step is being conflated with a completed device.

TUTTLE is used for teachings pertaining to the planarization of the top surface of an MRAM device by chemical mechanical polishing (CMP) to reject claim 20. Figure 2 of TUTTLE is reproduced below.

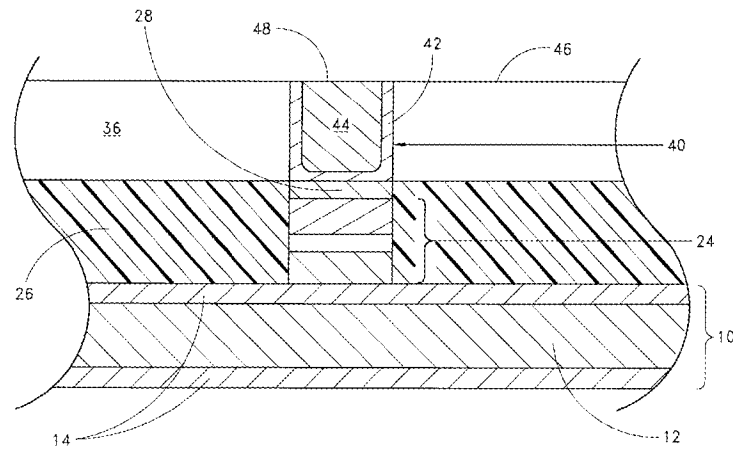


FIG. 2

In TUTTLE the MRAM is denoted by 24, and the multilayer film 50 formed on the wiring layer 44 is flattened. This flattening is fundamentally different from the present invention.

Regarding claim 26 to 28, these embodiments pertain to curved surfaces. When a process is executed to a sidewall, a curved surface is always formed. This is the same as the gate process in the CMOS process. In the applied art (such as OKAZAWA et al.), the curved surface is not formed because the process is different from that of the present invention.

OKAZAWA et al. thus fail to anticipate or render *prima facie* unpatentable a claimed embodiment of the present invention.

One of ordinary skill and creativity would fail to produce a claimed embodiment of the present invention from a knowledge of OKAZAWA et al. and TUTTLE.



A *prima facie* case of unpatentability has thus not been made.

These rejections are believed to be overcome, and withdrawal thereof is respectfully requested.

**Conclusion**

In light of the amendments provided above and arguments offered in support thereof, applicants believe the present application is in condition for allowance and an early indication of the same is respectfully requested.

If the Examiner has any questions or requires further clarification of any of the above points, the Examiner may contact the undersigned attorney so that this application may continue to be expeditiously advanced.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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